

Synthesis and thermoelectric properties of some materials with the PbBi_4Te_7 crystal structure

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Polycrystalline samples of several compounds with the PbBi_4Te_7 crystal structure have been synthesized and characterized by x-ray and microprobe analysis. Seebeck coefficient, electrical resistivity, and thermal conductivity measurements were also performed in the 300-650K temperature range. In addition to already known samples, several new compounds were synthesized including SnBi_4Te_7 and SnSb_4Te_7 . At room temperature, the thermoelectric properties can vary widely from semiconducting to semimetallic with both n- and p-type conduction. All samples possess thermal conductivity values comparable or lower to those obtained for Bi_2Te_3 -based alloys. Thermoelectric properties of some of these samples are presented and discussed. These compounds have a good potential for high ZT values in the 300-650K temperature range. The optimization of their thermoelectric properties through alloying will be discussed.

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